

CLAIMS:

1. A receiver for receiving signals which are at least partially known and which have followed a plurality of different paths to said receiver, said receiver comprising:

an arrangement for dividing the area of coverage of said receiver into a plurality of sections;

a plurality of receiving units, each of said receiving units being arranged to process a different one of said signals to identify said at least partially known part of said signal;

a controller coupled to the output of said dividing arrangement for selecting the signals which are to be allocated to the respective receiving units; and

an interference removing arrangement coupled to the output of said receiver units to remove interference.

2. A receiver as claimed in claim 1, wherein said dividing arrangement comprises a beamformer.

3. A receiver as claimed in claim 2, wherein said beamformer provides orthogonal beams.

4. A receiver as claimed in claim 1, 2 or 3, wherein the interference removing arrangement is arranged to filter out coloured interference.

5. A receiver as claimed in any of claims 1 to 4, wherein the interference removing arrangement comprise a plurality of interference removing units with a interference removing unit being coupled to the output of each of the receiving units.

6. A receiver as claimed in claim 5, wherein each interference removing unit uses signal information from a plurality of different sections.

7. A receiver as claimed in any one of the preceding claims wherein each receiving unit is arranged to use signal information

from three different sections.

5 8. A receiver as claimed in claim 7, wherein each receiving unit is arranged to consider the signal information from the section from which the signal allocated to the associated receiving unit has been received, and the adjacent sections on either side thereof.

10 9. A receiver as claimed in claim 5 or any claim appended thereto, wherein a combiner is provided for combining the output of the interference removing units to provide a single signal.

15 10. A receiver as claimed in any one of the preceding claims, wherein each of the receiving units is arranged to determine values which are used by said interference removing arrangement.

20 11. A receiver as claimed in claim 10, wherein each of said receiving units is arranged to calculate the channel impulse response of said allocated signal from said given one of the sections.

25 12. A receiver as claimed in claim 11, wherein each of said receiving units is arranged to calculate the channel impulse response of said allocated signal from said given one of the section and from the adjacent sections on either side thereof.

30 13. A receiver as claimed in claim 11 or 12, wherein each of said receiving units is arranged to calculate an average channel impulse response.

14. A receiver as claimed in any of claims 10 to 13 wherein each of said receiving units is arranged to calculate the difference between the desired signal and the received signal.

35 15. A receiver as claimed in claim 12, wherein each of said receiving units is arranged to calculate the difference between the desired signal and the received signal for the given one of

the sections from which the allocated signal is received and the adjacent sections on either side thereof to define a vector q .

16. A receiver as claimed in claim 14 or 15 wherein each of said receiving units is arranged to calculate an average difference between said desired and received signals.

17. A receiver as claimed in claim 15 or 16 when appended to claim 16, wherein a matrix is defined by $q \cdot q^H$ where q^H is the vector q transposed and the values thereof replaced by complex conjugates.

18. A receiver as claimed in claim 12 and 17, wherein each of said interference removing units is arranged to receive the channel impulse response values and said matrix from the respective receiving unit.

19. A receiver as claimed in claim 17, wherein each said interference removing unit is arranged to receive an average of the matrices of said receiving units and channel impulse response values.

20. A receiver as claimed in claim 19, wherein a weighting is determined from said matrix and said channel impulse response values, said weighting being applied to said signal.

21. A receiver as claimed in claim 21, wherein said weighting is applied to said signal from the allocated section and the signals from the adjacent sections on either side thereof.

22. A receiver as claimed in claim 20 or 21 wherein said weighting is defined by:

((the inverse of said matrix) \times (the channel impulse response values))^H

where H means that the inverse and complex conjugates are taken.

23. A receiver as claimed in claim 5 or any claim appended

thereto, wherein each said interference removing unit applies weighting to the received signal from at least the section allocated to the associated receiving unit, whereby the effects of interference are cancelled.

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24. A receiver as claimed in claim 2 or any claim appended thereto, wherein the beamformer arrangement comprises a Butler matrix.

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25. A receiver as claimed in any preceding claim, wherein the controller comprises means for determining the presence of said signals in each of said sections.

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26. A receiver as claimed in claim 25, wherein the determining means is arranged to determine the strength of the signals.

27. A receiver as claimed in claim 25 or 26, wherein the determining means comprises a plurality of separate units, each one being arranged to process signals from a respective one of said sections.

28. A receiver as claimed in any one of the preceding claims, wherein the plurality of receiver units define a RAKE receiver.

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29. A receiver as claimed in any one of the preceding claims, wherein said signals are in the code division multiple access format.

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30. A receiver as claimed in any one of the preceding claims, wherein said at least partially known part of said signals comprise at least one pilot symbol.

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31. A receiver as claimed in any one of the preceding claims, wherein said receiving units process said different one of said signals by correlating the signal with information on said at least partially known part thereof.

32. A base station incorporating a receiver as claimed in any one of the preceding claims.

33. A mobile station incorporating a receiver as claimed in any one of claims 1 to 31.

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